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मानक



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Mazdoor Kisan Shakti Sangathan

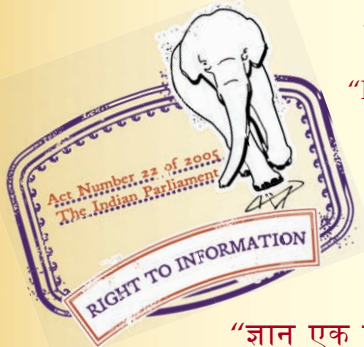
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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 13630-3 (2006): Ceramic Tiles - Methods of Test Part, Sampling and Basis of Acceptance 3 Determination of moisture expansion using boiling water - Unglazed tiles (see IS 13630 : Parts 1 to 15) [CED 5: Flooring, Wall Finishing and Roofing]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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IS 13630 (Part 3) : 2006

भारतीय मानक  
सिरैमिक टाइलें - परीक्षण पद्धतियाँ,  
नमूने लेने तथा स्वीकार्यता का आधार  
( पहला पुनरीक्षण )

*Indian Standard*

CERAMIC TILES — METHODS OF TEST,  
SAMPLING AND BASIS FOR ACCEPTANCE

*( First Revision )*

ICS 91.100.23

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BUREAU OF INDIAN STANDARDS  
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## FOREWORD

This Indian Standard (Parts 1 to 15) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first published in various parts in 1992-93. This is the first revision; having all parts combined in one publication, of the standard in which the following major changes have been incorporated:

- a) As per the decision taken in the last meeting, the requirements of all the parts have been included in one volume and the revised standard has been brought in line with ISO 10545 (various parts).
- b) The requirements for determination of bulk density have been added in Part 2 and a few changes have been made in the requirements for determination of water absorption.
- c) A few modifications have also been made in Part 3.
- d) Requirements for determination of breaking strength have also been added in Part 6.
- e) Requirements for determination of glazing resistance tests have also been modified in Part 9.
- f) A new test for determination of impact resistance by measurement of co-efficient of restitution has been added as Part 14.
- g) IS 13711 : 1993 'Sampling and basis for acceptance' has been amalgamated with Part 15 of this standard.

In formulation of this standard considerable assistance have been derived from the following standards:

- ISO 10545-1 : 1995 Ceramic tiles — Part 1 : Sampling and basis for acceptance
- ISO 10545-2 : 1995 Ceramic tiles — Part 2 : Determination of dimensions and surface quality
- ISO 10545-3 : 1995 Ceramic tiles — Part 3 : Determination of water absorption, apparent porosity, apparent relative density and bulk density
- ISO 10545-4 : 2004 Ceramic tiles — Part 4 : Determination of modulus of rupture and breaking strength
- ISO 10545-5 : 1996 Ceramic tiles — Part 5 : Determination of impact resistance by measurement of coefficient of restitution
- ISO 10545-6 : 1995 Ceramic tiles — Part 6 : Determination of resistance to deep abrasion for unglazed tiles
- ISO 10545-7 : 1996 Ceramic tiles — Part 7 : Determination of resistance to surface abrasion for glazed tiles
- ISO 10545-8 : 1994 Ceramic tiles — Part 8 : Determination of linear thermal expansion
- ISO 10545-9 : 2004 Ceramic tiles — Part 9 : Determination of resistance to thermal shock
- ISO 10545-10 : 1995 Ceramic tiles — Part 10 : Determination of moisture expansion
- ISO 10545-11 : 1994 Ceramic tiles — Part 11 : Determination of crazing resistance for glazed tiles
- ISO 10545-12 : 1995 Ceramic tiles — Part 12 : Determination of frost resistance
- ISO 10545-13 : 1995 Ceramic tiles — Part 13 : Determination of chemical resistance
- ISO 10545-14 : 1995 Ceramic tiles — Part 14 : Determination of resistance to stains
- ISO 13006 : 1998 Ceramic tiles — Definitions, classification, characteristics and marking

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

**CERAMIC TILES — METHODS OF TEST,  
SAMPLING AND BASIS FOR ACCEPTANCE**

**PART 3 DETERMINATION OF MOISTURE EXPANSION USING  
BOILING WATER — UNGLAZED TILES**

*( First Revision )*

**1 SCOPE**

This standard (Part 3) covers methods of test for determining the moisture expansion of unglazed ceramic tiles.

**2 TERMINOLOGY**

**2.1** For the purpose of this standard, the following definition shall apply.

**2.2 Moisture Expansion Using Boiling Water** — The difference between the means of measurements made on test specimens before and after subjecting them to boiling water. It is expressed as  $l/L$ , where  $l$  is the expansion after treatment in boiling water and  $L$  is the initial length.

**3 APPARATUS**

**3.1** Direct reading gauge with a minimum travel of 10 mm and an accuracy of at least 0.01 mm.

**3.2** Reference bars of nickel steel (invar) of the approximate lengths of the test specimens.

**3.3** Kiln

**3.4** Vernier calipers or other suitable apparatus, for linear measurement to the nearest 0.5 mm.

**3.5** An apparatus for maintaining the specimens in boiling water for 24 h.

**4 TEST SPECIMENS**

**4.1** Sample for each type of tile under test shall consist of seven whole tiles. Cut a test specimen from the centre of each tile of the greatest possible length of up to 100 mm with a minimum width of 35 mm and the thickness that of the tile.

**4.2** In the case of extruded tile the length of the test specimens shall be in the direction of the extrusion.

**4.3** Prepare the ends of the test specimens as required for the adopted measuring device.

**5 PROCEDURE**

**5.1 Refiring**

**5.1.1** If the test specimens become wet during cutting, keep them for 24 h at room temperature.

**5.1.2** Refire the test specimens in a kiln, with a temperature rise of 150°C/h and a 2 h soak at 600°C.

**5.1.3** Allow the test specimens to cool inside the kiln for at least 20 h, remove them when the temperature falls to  $70 \pm 10^\circ\text{C}$  and then keep them at room temperature for at least 20 h in a desiccator.

**5.1.4** Measure the test specimens twice with 3 h between measurements.

**5.1.5** Record the length of each test specimen relative to the length of the invar reference bar in order to eliminate possible variations of the measuring apparatus.

**5.1.6** Determine the initial length of each test specimen to the nearest 0.5 mm.

**5.2 Boiling Water Treatment**

**5.2.1** Immerse the test specimens in boiling water for 24 h consecutively, ensuring that there is at least 50 mm height of water above and the test specimen do not touch each other or touch the base and sides.

**5.2.2** Remove the test specimens and allow them to cool at room temperature, measure them after 1 h and again after a further 3 h.

**5.2.3** Record the measurement as in 5.1.

**6 EXPRESSION OF RESULTS**

**6.1** For each test specimens determine the mean of the two measurements prior to treatment in boiling water, the mean of the two measurements after boiling water treatment and then determine the difference between the two mean values.

**6.2** The moisture expansion, in mm/m is calculated from  $l/L \times 1\,000$ .

**7 TEST REPORT**

The test report shall contain the following:

- a) Description of the tiles; and
- b) Moisture expansion of each test specimen.

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This Indian Standard has been developed from Doc: No. CED 5 (7358 to 7372).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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